

## **EXHIBIT F**

60/209771



06/07/00

	Subclass	ISSUE CLASSIFICATION
	Class	

PROVISIONAL  
APPLICATION  
NUMBER

CHCII  
CS1

PATENT APPLICATION SERIAL NO. \_\_\_\_\_

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE  
FEE RECORD SHEET

06/09/2000 EHAMOND 00000063 60209771

01 FC:214

75.00 08

PTO-1556  
(5/87)

\*U.S. GPO: 1999-459-082/19144



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Bib Data Sheet

SERIAL NUMBER 60/209,771	FILING DATE 06/07/2000 RULE -	CLASS -	GROUP ART UNIT -	ATTORNEY DOCKET NO. 1179
APPLICANTS Ilan Ben-David, Rosh Ha'ayin, ISRAEL;				
** CONTINUING DATA *****				
** FOREIGN APPLICATIONS *****				
IF REQUIRED, FOREIGN FILING LICENSE GRANTED ** 08/29/2000				
Foreign Priority claimed 35 USC 119 (a-d) conditions met Verified and Acknowledged		<div><input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Met after Allowance Examiner's Signature Initials</div>	STATE OR COUNTRY ISRAEL	SHEETS DRAWING 1
		TOTAL CLAIMS -	INDEPENDENT CLAIMS -	
ADDRESS AIR MAIL Edward Langer POB 410 Giron Center 312 Raanana , - - ICELAND				
TITLE High gamut video display				
FILING FEE RECEIVED 75	FEES: Authority has been given in Paper No. _____ to charge/credit DEPOSIT ACCOUNT No. _____ for following:		<div><input type="checkbox"/> All Fees</div> <div><input type="checkbox"/> 1.16 Fees ( Filing )</div> <div><input type="checkbox"/> 1.17 Fees ( Processing Ext. of time )</div> <div><input type="checkbox"/> 1.18 Fees ( Issue )</div> <div><input type="checkbox"/> Other _____</div> <div><input type="checkbox"/> Credit</div>	

EDWARD LANGER, B.S.E.E., M.B.A., J.D.  
ADVOCATE & PATENT ATTORNEY

312 GIRON CENTER, P.O.B. 410 RAANANA 43103 ISRAEL  
TEL: 972-9-7713585 FAX: 972-9-7713593 E-MAIL: edlanger@netvision.net.il

Date: 5 June 2000

The Commissioner of Patents and Trademarks  
Box Patent Application  
Washington, D. C. 20231  
U.S.A.

Sir:

Enclosed herewith for filing is the following utility patent application: (PROVISIONAL)

Applicant: BEN-DAVID, Ilan

Title of Application: A HIGH GAMUT VIDEO DISPLAY

Pages of specification: 3 ( + 1 pp. of claims ~~XXXXXXX~~)

Sheets of drawing: 1

Executed on: 5 June 2000 Docket No.: 1179


TOTAL FILING FEE \$75.00

A check in the amount of the total filing fee is enclosed herewith.

Also enclosed herewith for filing in connection with the enclosed are:

☐ Oath;  
☒ ~~XXXXXXX~~ Provisional Cover Sheet  
☐ Disclosure Statement;  
☐ Letter referencing previously filed disclosure document; number \_\_\_\_\_ filed \_\_\_\_\_;  
☒ Verified Statement claiming small entity status;  
☐ An assignment of the application to: \_\_\_\_\_;  
☐ Claim(s) to priority  
☐ A certified copy of a \_\_\_\_\_ patent application or inventor's certificate, filed \_\_\_\_\_ and serial no. \_\_\_\_\_, upon which a claim to priority is made;  
☐ Other: \_\_\_\_\_

Respectfully submitted,

  
Edward Langer, Attorney  
Reg. No. 30,564

MEMBER OF ISRAEL & PENNSYLVANIA BARS  
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06/07/00  
1c535 U.S. PTO

1c541 U.S. PTO  
60/209771  
06/07/00

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01/31/2001. OMB 0851-0037  
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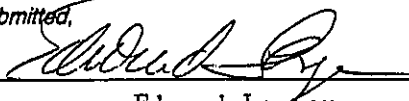
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**PROVISIONAL APPLICATION FOR PATENT COVER SHEET**

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

INVENTOR(S)					
Given Name (first and middle (if any))	Family Name or Surname	Residence (City and either State or Foreign Country)			
Ilan	BEN-DAVID	Rosh Ha'ayin, Israel			
<input type="checkbox"/> Additional inventors are being named on the ___ separately numbered sheets attached hereto					
TITLE OF THE INVENTION (280 characters max)					
A HIGH GAMUT VIDEO DISPLAY					
CORRESPONDENCE ADDRESS					
Direct all correspondence to:					
<input type="checkbox"/> Customer Number				Place Customer Number Bar Code Label here	
OR Type Customer Number here					
<input checked="" type="checkbox"/> Firm or <input checked="" type="checkbox"/> Individual Name Edward Langer					
Address POB 410					
Address Giron Center 312					
City Raanana		State		ZIP	
Country Israel		Telephone 972-9-7713585		Fax 972-9-7713593	
ENCLOSED APPLICATION PARTS (check all that apply)					
<input checked="" type="checkbox"/> Specification Number of Pages		3		<input checked="" type="checkbox"/> Small Entity Statement	
<input checked="" type="checkbox"/> Drawing(s) Number of Sheets		1		<input type="checkbox"/> Other (specify) <span style="border: 1px solid black; display: inline-block; width: 100px; height: 15px;"></span>	
METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT (check one)					
<input checked="" type="checkbox"/> A check or money order is enclosed to cover the filing fees					FILING FEE AMOUNT (\$)
<input type="checkbox"/> The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number: <span style="border: 1px solid black; display: inline-block; width: 150px; height: 15px;"></span>					\$75.00
The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.					
<input checked="" type="checkbox"/> No.					
<input type="checkbox"/> Yes, the name of the U.S. Government agency and the Government contract number are: _____					

Respectfully submitted,

SIGNATURE 

TYPED or PRINTED NAME Edward Langer

TELEPHONE 972-9-7713585 (Israel)

Date 06/05/00

REGISTRATION NO. 30,564

(if appropriate)

Docket Number: 1179

**USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT**

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C., 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C., 20231.

Date : 19-05-2000

Title: **A High Gamut Video Display**

Inventor: Ilan Ben-David, 55 Paamon st. , Rosh Haayin , ISRAEL 40800

Reference : Gary G. Field , Color and its Reproduction , GATFPress , 1999

**Background:**

Video displays are used to display digital data, the digital file is represented in a form of image data to be displayed. Today's video display systems are using additive color system based on the addition of 3 the primary colors red , green and blue . By mixing different proportion of the primary colors the different colors are created. The volume in color space that a device can display is called color gamut of the device.

While electronic display devices are based on different technologies (CRT's, LED, LCD projectors and more) they all use the same principals of the additive RGB color system. Due to limitations in the primary colors spectral response, existing display devices can not show the full range of colors the human eye can see. Colors that can not be reproduced on the display device are called out of Gamut colors.

Another problem of the electronic display devices is that they are based on emitting radiation from the display to the viewer's eye. In contrast, most natural objects are reflective and their color appearance is highly dependent on the lighting environment i.e. light source properties.

This means that color match could be achieved between an object and color display only under strictly controlled viewing conditions (impossible constraint in most cases). One way to over come this is to have a correction mechanism to compensate for different light sources. This solution although possible is based on using different mathematical color transformation on the image data for each lighting condition, again a very unfeasible solution in the real world, where lighting condition change from room to room and in different position in the same room.

**The solution**

A new display device based on the following principals:

1. Passing white light through color filters creates the primary colors. The white light can be controlled independently both in intensity and spectrum.
2. The number of filters used to create the primary color is more then 3. (In the preferred embodiment, 7 filters are used ( red , green , blue , cyan magenta and white ) .
3. Spatial light modulator technology (such as LCD (liquid crystal display) or DMD (deformble mirror device) ) is used to create the image. Each color

- frame is composed from monochrome frames as the number of colors. For example in a 7 primary color display, 7 monochrome frame are generated.
4. The RGB or CMYK image file is transformed into a right number of color components .For example, In case of 7 color display the transformation is based on Neugebauer equations (see reference page 407). On the general case a M to N look up table transformation is used where M is the number of primary color in the image file and N is the number of primary colors in the display.

The suggested solution has the following advantages:

1. Large color gamut compared to conventional RGB displays.
2. Using color filters allows freedom in selecting primary colors. This allows selecting color filters that can accurately simulate painting and printing process by using the same spectral characteristics as the primary color used in the "real" world specific process.
3. By controlling the white light source both in intensity and spectrum, compensation for different lighting conditions is done easily. This compensation is done on the device itself and not on the image file and it follows the physical process that exists in nature.

### **Implementation**

The system is composed from two major parts:

1. Color transformation module.
2. Display module.

#### Color transformation module

This module which is part of the display s/w driver converts the file from RGB color coordinates (or CMYK in case of a graphic arts file) to the color coordinates of the display . In the special but important case of 7 color display with the primary colors are red , green , blue , cyan , magenta , yellow and white . The transformation is based on Neugebauer equation and their improvements (see reference page 407) . This module replace the existing color management module in the operating system for screen display (ColorSync in apple computers Mac OS operating system and ICM in Microsoft windows operating system) . An alternative solution will be to have the display color transformation module on the video board. This allows performing some of the calculation in h/w reducing the time needed to make the transformation. This also makes the structure of the new display transparent to the host computer.

#### Display module

In the heart of the display module sits the projection engine . This projection engine receives the data for the different colors and project the light

accordingly . The projection engine can be designed in many different ways. The two major options are:

1. Having a separate spatial light modulator for each color (typical RGB device employing this principal is EPSON EMP-500 multimedia projector) implementing the same concept to 7 color is straightforward extension on the same design principals. This method is not optimal for the design of a 7 color display due to high part count and complex and sensitive optical alignment.

2. Using one special light modulator and be sequentially illuminating it with the primary colors and displaying in synchronization the monochrome image corresponding to the specific primary color ( a typical RGB device employing this principal is DP X16 by DAVIS , Norway ) . This configuration shown in Fig 1. is the preferred embodiment for the 7 color display device, it enjoys low part count and simpler optical alignment (see fig 1).

Combinations of the above methods (several SLM's each projects more then one primary color) are also possible and are being used in some RGB projection devices.

The light emitted from the projection engine can be projected on a screen or on opal glass for rear or front viewing.

Claim:

1. A video display device employing more then 3 primary colors to create color images.

PTO/SB/09 (12-97)  
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**STATEMENT CLAIMING SMALL ENTITY STATUS  
 (37 CFR 1.9(f) & 1.27(b))—INDEPENDENT INVENTOR**

Docket Number (Optional)  
 1179

Applicant, Patentee, or Identifier: BEN-DAVID, ILAN

Application or Patent No.: \_\_\_\_\_

Filed or Issued: \_\_\_\_\_

Title: A HIGH GAMUT VIDEO DISPLAY

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- ☒ the specification filed herewith with title as listed above.  
☐ the application identified above.  
☐ the patent identified above.

I have not assigned, granted, conveyed, or licensed, and am under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ No such person, concern, or organization exists.  
☐ Each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Ilan BEN-DAVID  
 NAME OF INVENTOR

NAME OF INVENTOR

NAME OF INVENTOR

[Signature]  
 Signature of inventor

Signature of inventor

Signature of inventor

June 5, 2000  
 Date

Date

Date

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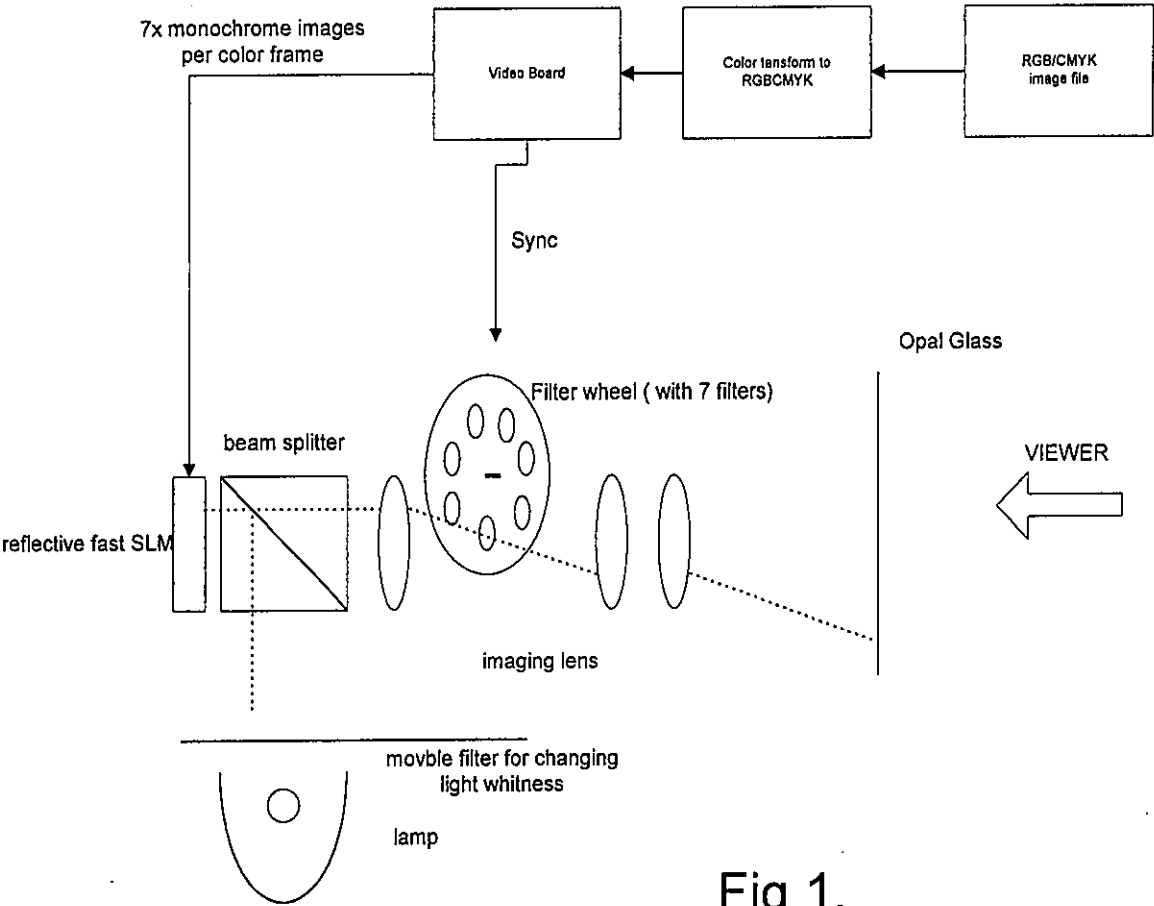
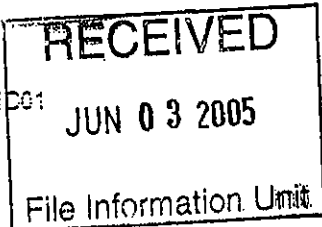


Fig 1.

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In re Application of \_\_\_\_\_

Application Number

60/209,771

Filed

Jun, 7, 2000

Paper No. #2

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. 2004/0100541 page, \_\_\_\_\_ line \_\_\_\_\_

United States Patent Number \_\_\_\_\_, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_

## Related Information about Access to Pending Applications (37 CFR 1.14):

Direct access to pending applications is not available to the public but copies may be available and may be purchased from the Office of Public Records upon payment of the appropriate fee (37 CFR 1.19(b)), as follows:  
For published applications that are still pending, a member of the public may obtain a copy of:

- the file contents;
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- any document in the file of the pending application.

### For unpublished applications that are still pending:

- (1) If the benefit of the pending application is claimed under 35 U.S.C. 119(e), 120, 121, or 365 in another application that has: (a) issued as a U.S. patent, or (b) published as a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of:
  - the file contents;
  - the pending application as originally filed; or
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- (2) If the application is incorporated by reference or otherwise identified in a U.S. patent, a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of:
  - the pending application as originally filed.

M. Leung  
Signature

06-03-2005  
Date

SHAHAB GHAYOUR  
Typed or printed name

Registration Number, if applicable

(703) 521-1010  
Telephone Number

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Unit:

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In re Application of

Application Number

60-209771

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6-7-00

Paper No. 3

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line \_\_\_\_\_,

United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_.

**Related Information about Access to Pending Applications (37 CFR 1.14):**

Direct access to pending applications is not available to the public (see 37 CFR 1.14(c) if applicant) but copies may be available and may be purchased from the Office of Public Records upon payment of the appropriate fee (37 CFR 1.19(b)), as follows:

For published applications that are still pending, a member of the public may obtain a copy of:

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- any document in the file of the pending application.

For unpublished applications that are still pending:

- (1) If the benefit of the pending application is claimed under 35 U.S.C. 119(e), 120, 121, or 365 in another application that has: (a) issued as a U.S. patent, or (b) published as a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of:
  - the file contents;
  - the pending application as originally filed; or
  - any document in the file of the pending application.
- (2) If the application is incorporated by reference or otherwise identified in a U.S. patent, a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of:
  - the pending application as originally filed.

Darlene Jones  
Signature

Darlene Jones  
Typed or printed name

Registration Number, if applicable

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PTO/SB/68 (09-06)

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2900 Crystal Drive

Arlington, VA 22202-3514 MAR 22 2007

Telephone: (703) 308-2733

File Information Unit

In re Application of

Application Number

60/209771

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6/7/00

Paper No. #4

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified ABANDONED application, which is not within the file jacket of a pending Continued Prosecution Application (CPA) (37 CFR 1.53(d)) and which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line \_\_\_\_\_

United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_

**Related Information About Access to Applications Maintained in the Image File Wrapper System (IFW) and Access to Pending Applications in General**

A member of the public, acting without a power to inspect, cannot order applications maintained in the IFW system through the FIU. If the member of the public is entitled to a copy of the application file, then the file is made available through the Public Patent Application Information Retrieval system (Public PAIR) on the USPTO internet web site (www.uspto.gov). Terminals that allow access to Public PAIR are available in the Public Search Room. The member of the public may also be entitled to obtain a copy of all or part of the application file upon payment of the appropriate fee. Such copies must be purchased through the Office of Public Records upon payment of the appropriate fee (37 CFR 1.19(b)).

For published applications that are still pending, a member of the public may obtain a copy of:

the file contents; the pending application as originally filed; or any document in the file of the pending application.

For unpublished applications that are still pending:

- (1) If the benefit of the pending application is claimed under 35 U.S.C. 119(e), 120, 121, or 365 in another application that has: (a) issued as a U.S. patent, or (b) published as a statutory invention registration, a U.S. patent application publication, or an international patent application publication in accordance with PCT Article 21(2), a member of the public may obtain a copy of: the file contents; the pending application as originally filed; or any document in the file of the pending application.
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*Steve Dley*  
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Steve Dley  
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Application Number

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Paper No. 5

I hereby request access under 37 CFR 1.14(a)(1)(iv) to the application file record of the above-identified **ABANDONED** application, which is not within the file jacket of a pending Continued Prosecution Application (CPA) (37 CFR 1.53(d)) and which is identified in, or to which a benefit is claimed, in the following document (as shown in the attachment):

United States Patent Application Publication No. \_\_\_\_\_, page, \_\_\_\_\_ line OCT 15 2007United States Patent Number 6870523, column \_\_\_\_\_, line, \_\_\_\_\_ or

WIPO Pub. No. \_\_\_\_\_, page \_\_\_\_\_, line \_\_\_\_\_

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(12) **United States Patent**  
**Ben-David et al.**

(10) **Patent No.:** **US 6,870,523 B1**  
(45) **Date of Patent:** **Mar. 22, 2005**

- (54) **DEVICE, SYSTEM AND METHOD FOR ELECTRONIC TRUE COLOR DISPLAY**
- (75) **Inventors:** **Ilan Ben-David, Rosh Hayin (IL); Moshe Ben-Chorin, Rehovot (IL)**
- (73) **Assignee:** **Genoa Color Technologies, Herzliya (IL)**
- (\*) **Notice:** Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

- (21) **Appl. No.:** **09/710,895**
- (22) **Filed:** **Nov. 14, 2000**

**Related U.S. Application Data**

- (60) **Provisional application No. 60/209,771, filed on Jun. 7, 2000.**
- (51) **Int. Cl.<sup>7</sup>** ..... **G09G 3/34**
- (52) **U.S. Cl.** ..... **345/84; 345/32; 348/743; 348/744**
- (58) **Field of Search** ..... **345/84, 85, 691, 345/697, 32; 349/5, 106, 108; 348/743, 544**

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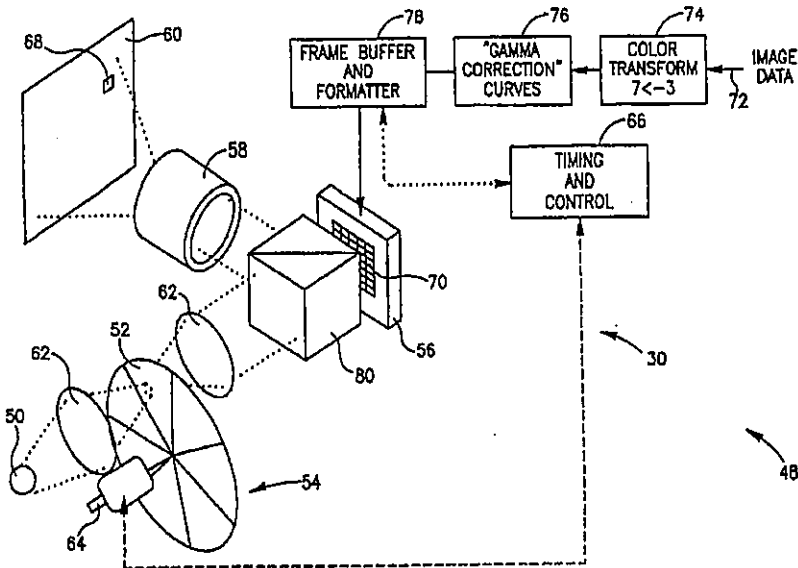
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**Primary Examiner**—Jimmy H. Nguyen  
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(57) **ABSTRACT**

A device, system and a method for displaying an expanded spectrum of colors. The present invention is suitable for various types of electronic display devices, such as televisions and monitor devices ("monitors") for computational devices, for example. The present invention operates by electronic production of more than three primary colors. As previously described, the term "primary color" specifically does not include light as produced by a neutral filter. Thus, unlike background art systems and devices, the present invention is not limited to combinations of colors which are produced from only three primary colors, such as red, green and blue for example.

24 Claims, 10 Drawing Sheets



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# PATENT APPLICATION



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